REMARKS/ARGUMENTS

In the outstanding office action dated 07/17/2006, claims 1-10 have been examined. By way of the outstanding office action: claims 1-3 and 8-9 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bartholmuss (DE19920195) in view of Klotz (US20030015170) and Buckley (US6564856), claims 4-7 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Bartholmuss, Klotz and Buckley and further in view of Smith (US6405711), claim 10 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Bartholmuss, Klotz and Buckley and further in view of Brosseau (US6338333)

In response, claim 1 has been amended and claims 9 and 10 have been cancelled. Accordingly, claims 1-8 are pending in the present application.

Claim 1 has been amended by encompassing the subject matter of dependent claims 9 and 10. For the reasons set forth below, it is submitted that claims 1-8 are allowable

Claim 1 recites, in part, that the fuel manifold is formed by a single monolithic body which is made of thixotropic aluminum by means of a pressure die casting process. Contrary to what stated in the outstanding office action, the German text of Bartholmuss was reviewed by Applicant's European counsel and there was no reference to the intermediate manifold 7 being made of aluminum. Furthermore, Bartholmuss was cited only as a category A prior art reference by the European Patent Office.

In recent years, fuel-driven internal combustion engines, in which the fuel is injected directly into the cylinders, have come to the fore; in these engines, the fuel is supplied under pressure to a fuel manifold connected to a series of injectors (one for each cylinder of the engine), which are actuated cyclically to inject part of the fuel under pressure in the fuel manifold into a respective cylinder. In known engines with indirect fuel injection, the fuel manifolds are currently made from plastic material (typically molded technopolymers) and are secured to the intake manifold, which is also generally made from plastic material, by means of a series of screws. Plastic material is easy to process and extremely economic, but does not have good mechanical properties and is not therefore able to bear the relatively high pressures of the fuel used in direct fuel injection with the necessary safety margins. In order to ensure the necessary mechanical strength, it has been proposed to use fuel manifolds made from steel in known direct fuel injection engines; these fuel manifolds are nevertheless costly because of the number of machining and welding operations to which they have to be subject. It has also been proposed to use fuel manifolds made from cast aluminum by means of

gravity die casting; these fuel manifolds are also costly as gravity die casting is a relatively slow production method, requires a large number of machining operations once the component has been removed from the casting mould and imposes minimum component thickness of no less than 4-5 mm.

The present application is the first document proposing to use thixotropic aluminum for making a fuel manifold of a fuel-driven internal combustion engine in which the fuel is injected directly into the cylinders. Note that Buckley does not disclose or even suggest that the thixotropic aluminum can be used for making a fuel manifold of a fuel-driven internal combustion engine. In particular, Buckley suggests to use the proposed technology for making precision castings such as brake calipers; it is noted that a brake caliper is even not a part of an internal combustion engine.

Claim 1 recites, in part, that the main cylindrical tubular channel has two opposite open ends, one of which is used to supply the fuel under pressure and the other is closed by a screw cap; in the vicinity of the end closed by the screw cap, the main cylindrical tubular channel has a first opening adapted to receive a pressure regulator and a second opening adapted to receive a pressure sensor.

Brosseau discloses that the main cylindrical tubular channel has two opposite open ends, one of which is used to supply the fuel under pressure and the other is closed by a fuel pressure regulator 40 (see for reference Figure 2). Furthermore, the pressure sensor 42 is not arranged close to the end of the main cylindrical tubular channel opposite to the fuel supply, but it is arranged close to the middle of the main cylindrical tubular channel. Accordingly, Brosseau does not disclose that an end of the main cylindrical tubular channel opposite to the fuel supply is closed by a screw cap and that in the vicinity of the end closed by the screw cap there are a first opening adapted to receive a pressure regulator and a second opening adapted to receive a pressure sensor.

Klotz discloses that both of the opposite open ends of the main cylindrical tubular channel are closed by plug 16 (see for reference Figure 1) and thus Klotz does not disclose or even suggest that one end of the main cylindrical tubular channel is used to supply the fuel under pressure. The Examiner makes reference to Klotz for the disclosure of prior art devices having been made as one-piece structures constructed of aluminum. However, upon closer examination of Klotz, what Klotz discloses is that the prior art flanges are generally made of aluminum but the intake ducts can be made of synthetic resin material (paragraph 0004).

Furthermore, in paragraph 0011, the reference made therein is to prior art flange subunits designed as a single piece and made of metal.

Smith discloses that a one end of the main cylindrical tubular channel is closed by a fuel pressure sensor.

In order to reach the invention as claimed by claim 1, one would have to completely disregard the teachings given by Bartholmuss, in which the intermediate manifold is not made by thixotropic aluminum by means of a pressure die casting process. The teaching of Buckley cannot be combined with the teaching of Bartholmuss, because Buckley does not suggest to use the thixotropic aluminum for making a fuel manifold of a fuel-driven internal combustion engine or even a part of a fuel-driven internal combustion engine. Furthermore, In order to reach the invention as claimed by claim 1, one would have to completely disregard the teachings given by Brosseau, in which one end of the main cylindrical tubular channel is not closed by a cap and the pressure sensor is not arranged close to the end of the main cylindrical tubular channel opposite to the fuel supply. There would be no suggestion to discard these teachings without using applicant's own disclosure as a template, and no such suggestion can be found in the references in any event.

For these reasons, claim 1 is allowable. Dependent claims 2-8 depend on claim 1 and thus are also allowable.

The advantages of the fuel manifold defined by amended Claim 1 include its ability to safely handle fuel supply pressures of nearly 130 bar yet be capable of being simply and economically produced. In none of the references cited by the Examiner, which disclose metal produced by conventional means or metal and plastic combinations, are such advantages present. Furthermore, the references cannot be effectively combined based on which they disclose without utilizing applicant's disclosure as a blueprint. Klotz, for example, specifically discloses the benefits of utilizing different materials for the fuel conduit and intake channels.

In view of the above, it is submitted that the claims are in condition for allowance. However, if the Examiner believes that further issues remain, it is requested that he telephone the undersigned at 260-460-1692.

Respectfully submitted,

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Date